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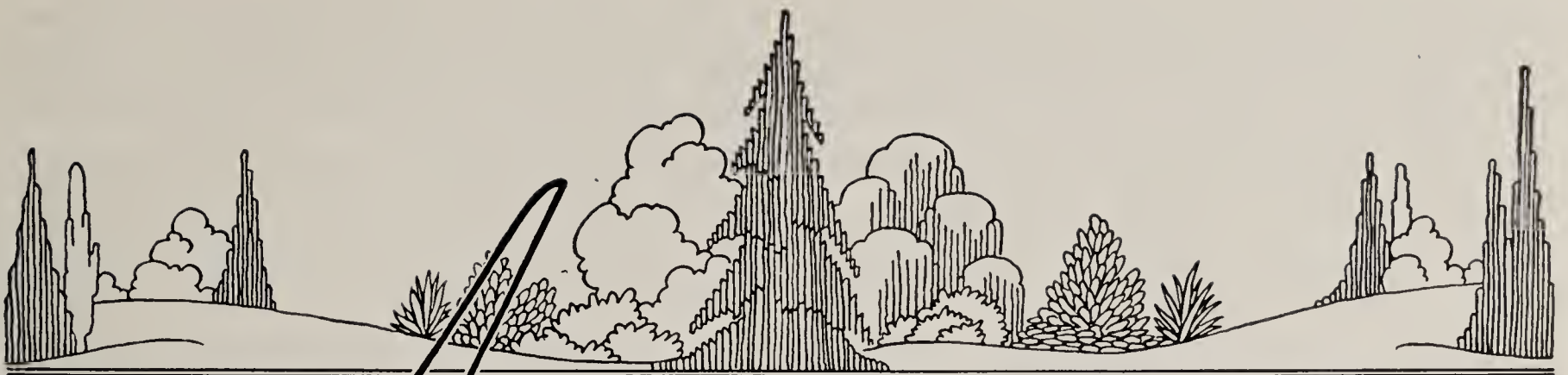
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The Arboretum Bulletin

VOLUME XVI

FALL, 1953

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Three Visits to the Edinburgh Botanic Garden

GRACE T. DOWLING *

DURING the summer of 1952 my first visit to the Edinburgh Botanic Garden led down a long hill from the little guest house where I was staying in Crescent Square. At the foot of the hill it was a fairly short walk through Inverleith Park to the West gate of the garden. I asked the keeper in the little stone gate house where I could find Dr. Cowan. Every visitor to Scotland is treated like a personage; instead of directing me he called a workman who dropped his lawnmower instantly and, slipping on his jacket, escorted me across the garden to the offices. As we sauntered along he told me that the garden covered about sixty acres, with the employment, more or less, of one hundred workmen. We passed through the "Rhododendron Walk" and he described its great beauty when the rhododendrons were in bloom.

Finally we reached the Laboratories but Dr. Cowan was not in, so I enjoyed exploring alone. It was between seasons, late in June. There were comparatively few shrubs in bloom but the glasshouses were extensive and conspicuous. There was one huge glass dome, seventy feet high, where palms are grown. This house was first constructed in 1832 and has been enlarged gradually throughout the years. There is a fern house, a succulent house, an economic house where many medic-

inal plants are grown, such as the castor oil plant, the eucalyptus, and coca plant from which cocaine and strychnine are extracted. There are tea, coffee, cinnamon, tapioca and many others which supply familiar domestic commodities.

Scotland is far north and cold in winter. Many plants we grow in the open must, in Edinburgh, be protected during the cold seasons. There is a large glasshouse full of rhododendrons. I recognized *R. decorum*, *R. Falconeri* and *R. Griersonianum* among many others I had never seen before. One house, called the Insectivorous house, fascinated me. It is filled only with those plants whose leaves are cunningly fashioned to attract insects upon which they live. I found sundews that grow in our bogs, and *Darlingtonia*, native of California.

On my next visit I entered by the East gate and went to the offices where I found Dr. Cowan. I had been interested in some so-called unpublished papers of John Jeffrey, one of the early plant explorers whom the Edinburgh Botanic Garden had sent to America and who had collected extensively in the Northwest. I had been to the University of Edinburgh as well as the National Library searching for them. Dr. Cowan assured me all letters of the unfortunate young voyager were known and could be found in a small volume published by the Botanic Garden which he very kindly gave me. He asked Mr. Wilkie, a member of

*Mrs. J. Thomas Dowling, member of our editorial staff, brought back this interesting impression of one of the "highlights" of her trip to Europe in the summer of 1952.

the staff, to walk through the garden with me. Our visit was especially interesting because Mr. Wilkie is a friend of Mr. Mulligan and we had mutual acquaintances among growers and nurserymen in British Columbia.

Near the garden offices is the "Student's Collection." This is a large group of parallel, rectangular beds, each containing specimens of one botanical family. They begin with the Buttercup family and end with the grasses. This, Mr. Wilkie explained, was much in the manner that the first Botanic garden was arranged. It is used by the students of the Edinburgh School of Medicine.

From here we walked through "The Copse," a woodland garden where I saw summer remains of many of our native, spring-flowering plants: *Trillium*, *Shortia*, wintergreens, *Erythronium* seed pods and many others. This garden has great charm and natural beauty with winding paths under the shelter of huge beech trees. In some places there are great masses of rhododendrons and evergreen

shrubs. There were still blossoms of various *Meconopsis* and a large planting of *Lilium giganteum*, six to eight feet high, which delighted me. I had never seen such large numbers of this giant lily. They rose from banks of *Primula Florindae* and *Meconopsis betonicifolia* (*Baileyi*). At the edge of the woodland were the peat walls, something quite unique. They were blocks of peat cut from the peat bogs and piled one upon another where especially precious, acid-loving plants are grown; many species of rare primroses, dwarf rhododendrons and unusual plants collected from great distances and seldom seen.

Next we came to "The Hill" from which we had a magnificent view of the city; Arthur's Seat, a distinctive promontory, and Edinburgh Castle on the horizon. From here Mr. Wilkie pointed out the plan of the garden

(Below)

Edinburgh Botanic Garden; view of smaller
scree and rock plant area

—PHOTO BY B. O. MULLIGAN



which lay at our feet with its park-like plantings of trees and its many areas of interest. He told me how, in 1661, a young Dr. Sibbald came back to Scotland from his medical studies in Holland, horrified at the lack of material and the ignorance of the "apothecaries and surgeons" of his native land. He immediately took steps to plant a "physic garden" on a plot of ground at the foot of Calton Hill, in the center of what is now the heart of the city of Edinburgh. In 1789 this and another, the King's Botanic Garden at Holyrood Castle, were combined and moved to a larger location. Due to the influx of botanical material pouring in from the New World, again a new site seemed feasible and the present garden, the third, was established on the Inverleith property.

By this time Mr. Wilkie and I had reached the Balfour memorial, a planting kept in the same character as the rest of the garden. Here there is included a collection of Chinese Firs (*Abies Forrestii*) that honor the memory of Mr. George Forrest, the famous collector of Chinese plants. The "Great Yew" that was planted in the original garden in the seventeenth century dominates this area. Now, having grown in three locations, this truly great tree still holds its head high and has every appearance of well being.

Sir Isaac Bayley Balfour directed the building of the rock garden and it is, indeed, a noble monument. It is called the largest rock garden in the world and its beauty is unquestionable. Built of huge blocks of stone brought from Ben Ledi in Perthshire it looks like a tremendous, natural outcropping of red sandstone, with rivulets of water trailing through the valleys and finally disappearing in a large flat area, a moraine or scree of broken rocks where are many plants loving such locations. There are paths and steps winding up, along and down where there are always many visitors. On a trip to Loch Lomond I sat next to an Edinburgh woman on the bus. She told me she often spent afternoons in the garden. One day while she was near the Rock Garden a workman passed her saying "the King and Queen are here." And, indeed, to her great

pleasure King George VI and Queen Elizabeth were coming down the steps of the Rock Garden, unattended, reading the labels on some especially beautiful blooming plants. I was interested to find that a family of plants adding greatly to the color and beauty of the rock garden at this season of the year was none other than the *Penstemon* tribe from Washington and Oregon.

On yet another day I visited the herbaceous borders. Entering the East gate I passed "The Pond" and the large rose gardens. The borders reach two hundred feet in length with a magnificent background of beech trees grown in a hedge and seeming to reach the sky. The flower areas at this mid-season were full of bloom. Close beside and in the shade of the beech hedge is the border containing only species. All the wild flowers that can tolerate this climate have been collected from every corner of the world and planted in this long border. There were many that I had not seen since I was a child. About six feet in front of this border, running parallel to it and with a grass path between, was the border of herbaceous hybrids. These had been planted with great skill, the colors of the flowers and the different heights professionally considered. Again, across a wide walk, many, many seats had been placed where visitors to the garden can view the beauty of the borders, read, knit or just look and rest. There was a friendliness in the whole garden that had, I felt, grown along with the years.

THE ARBORETUMS AND BOTANICAL GARDENS OF NORTH AMERICA

by

DR. DONALD WYMAN

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Carl Linnaeus—1707-1778

MRS. HILDA SWIFT*

THE name Linnaeus presents a very interesting story. It was not a family name for Ingemassen was the future botanist's surname. An uncle, when a boy, decided that a Latin name would look more appropriate signed to his Latin lesson than his Swedish name, Sven Tillander. He was very fond of a certain Linden tree so he chose Linnaeus for his signature. Sven Tillander was studying for the ministry and in those days tutors lived with a family and the relatives who wanted educational advantages for their children sent them to study with the tutor also. Carl Ingemassen was sent to study under the Tillander tutor and was familiar with his uncle's Latin signature, so later when he signed his scientific writings which were in Latin he used his uncle's manufactured name. It is strange that this name replaced his real name. When in later years the King of Sweden knighted the then famous botanist and conferred on him the Order of the Polar Star, it was granted to Carl Linne or Linnaeus and not to Carl Ingemassen.

Love of nature seems to have been a family trait. When Carl was scarcely more than learning to talk, his father was teaching him the names of flowers and trees. Life was serene during those early years, but when it was time to start Carl on his training for the ministry, trouble began. Having a minister father, he was accustomed to hearing Latin and Greek and these subjects he studied willingly, but to Hebrew and theology he closed his mind. The tutor finally gave up trying to teach him and advised the father to apprentice his son to some trade as he was too dull for further tutoring.

Fortunately for Carl, the family physician, knowing of the boy's great interest in plants, suggested that he might make a good doctor. Carl lived in Dr. Rothman's home, and from this time on the doctor was the directing in-

fluence in the boy's life. The rudiments of medicine, some physiology and the recognition and use of medicinal herbs were now his chief studies. A new book on botany which the doctor gave Carl to study probably started him on his career. A French scientist, Dr. Tournefort (1694-1730), had written a book advancing the theory that the corolla of a flower was the determining factor in plant classification. After the death of Tournefort, one of his students published an abridged edition of the book and added his own theory in another article, namely, that the corolla was of no importance, that the stamens, pistil and seed capsules were the determining factors in classification. Linnaeus, after studying this book, spent most of his time examining flowers and deciding for himself which theory was correct. Indeed, he was so engrossed and was doing such seemingly strange things that the neighbors considered him slightly demented.

Dr. Rothman was certainly a wise friend and teacher for within the year he was urging his protege to seek educational advantages at the University at Lund and later to the larger University of Upsala. Since there was no money to pay for such schooling, Linnaeus was often found at work in some doctor's or scientist's home cataloging and classifying collections of minerals, birds, fish or herbaria. These were the beginnings of a succession of bringing order to collections. Very soon he began to notice that there seemed to be an underlying order or pattern to his cataloging. Birds fell into groups, upland, aquatic, with many smaller subdivisions; fish and plants followed a pattern also. At this early period in life Linnaeus wrote a treatise embodying his observations which he called "Systema Naturae," but which was not published until later.

Before completing his work at the University at Upsala, the Swedish government asked him to make a survey of the natural resources of Lapland. He completed this 2500-mile trip through wild and undeveloped country and

*Mrs. George Swift, long a zealous gardener and Foundation member, will be remembered for her fine article on "Archibald Menzies," published in the Summer of 1950.

brought back the needed information and about one hundred plants that were new. Among them were *Andromeda Polifolia* and *Linnaea borealis*, the Twin flower, which Linnaeus took as his personal symbol.

The following two years were spent in tutoring and giving lectures on mineralogy and botany. Dr. Brownallius, whom he met at this time, urged him to write a thesis on medicine and present it to some foreign university for a degree. Love had come to Linnaeus and a degree in medicine would assure him a real livelihood which botany had not and make marriage a possibility. At the University of Hardenwijk in Holland in 1735 his thesis was accepted and a degree granted. Instead of returning at once to Sweden he wanted to meet some of the famous botanists of the time and visit the fine botanic gardens. At Linden he met some enthusiastic young scientists and when he showed them his manuscript, "Systema Naturae," Dr. Gronovius asked the privilege of printing it at his own expense. When finished the abridged folio represented two pages of tables on minerals, three pages on plants and two on animals from human beings to worms, all systematically arranged according to species. Never before had this been done and, though there was plenty of opposition to this innovation, still his ideas seemed too logical and fundamental to be refuted.

For some time Linnaeus had been working on two other manuscripts dealing exclusively with botany. There was probably more confusion in the field of botany than in any other because of its more constant use during the centuries. Physicians had been the chief botanists and herbs the important factor as a curative agent. The medicinal reaction of a herb placed it in the category of the emetics, diuretics or soporifics, a quite unscientific lore had been passed down through the years; the shape of a leaf, its color or markings, might suggest an organ of the body or the appearance of a disease, and this was considered a divine sign of the plant's value in curing ailments of those organs or diseases. The *Hepatica*, with its kidney-shaped leaf, became the cure of kidney trouble; *Pulmonaria* was

used for lung disorders. These are only two examples from many. Each physician and each locality might have a different name for the same plant. To add to the confusion, some names had come from as far back as 20 B.C. Real people and mythological characters were immortalized, for example: *Gentiana* for Gentius, King of Illyria; *Helenium* for Helen, wife of King Menelaus of Sparta; Paeony for Paeon, the physician to Hercules. A great number of religious names like *Oculus-Christi*, the aster, or the Herb of the Holy Child, the dock, were in use. Numerous saints had herbs carrying their names as St. Benedict's herb, *Geum*, or St. Anthony's herb, *Epilobium*.

In view of all the confusion Linnaeus took upon himself the task of clarifying botanical nomenclature. In his first manuscript he laid down a series of rules which he felt were fundamental; for example,

- a. Terminology should be in Latin, but if a name had persisted from the Greek it should be kept but written in Latin script.
- b. Where a single genus was concerned there could be but one name.
- c. The foundation of all plant classification rested on genera and species.

There were many essential points in this manuscript which he called "Fundamenta Botanica," very soon followed by another called "Critica Botanica" in which he developed each fundamental point in detail. In the preface of the second document he wrote, "I submit my rules, the rules which I have laid down for myself and according to which I intend to work. If they seem to you worthy, let them be used also by you. If not, please propound something better."

In the "Critica Botanica" Linnaeus considered what to do with name duplication, whether the religious names such as *Oculus-Christi* were appropriate for plant terminology and what should be discarded. He did such good work that when the latest revision of classification and nomenclature was made in 1935 by the International Rules Committee, the points made by Linnaeus in 1735 stood

(Continued on Page Twenty-eight)

Plant Nomenclature

EDITH HARDIN ENGLISH *

IT is interesting when visiting any particular part of the country to make inquiries concerning the common names applied locally to the various native plants. A fascinating compilation of botanical folklore may be assembled in this manner, the list of names and their quaint applications lengthening as the collector crosses each natural barrier effected by mountain, lake, river or desert. The various species of *Dodecatheon* will be shooting stars in one area, love darts in another, rooster bills in a third and bird bills in a fourth. Members of the genus *Erythronium* will be known as avalanche lilies, glacier lilies, trout lilies, lambs tongues, adders tongues or dogtooth violets.

To further complicate the plant identification according to the local vernacular, not only do certain plants have a surprising multiplicity of names but the reverse is also encountered. A certain common name may be applied to many totally different plants. The name bluebell, for instance, is one of the most frequently used. In England *Scilla nonscripta* is called the bluebell; in Spain *Scilla hispanica* claims fame by this name; in eastern Washington *Mertensia longiflora* and its variety *pulchella* are the much-loved bluebells, and in western Washington and throughout a large part of the northern hemisphere it is *Campanula rotundifolia* that is known as bluebell.

Considering this same *Campanula rotundifolia* from a world-wide viewpoint, since it is circumpolar in distribution, we can glean an enlightening over-all picture of the hopelessness of the Utopian ambition to have one common name applied universally to each plant. Language barriers alone would be sufficient reason for the failure of such a scheme. It is far from possible, and indeed it is quite undesirable, to standardize common plant names even throughout the breadth of our own country.

Common plant names are, and should be,

just what the words themselves indicate, the commonly used means of identification of plants among the inhabitants of any given community or locality.

Seldom are these names meaningless. The meaning usually had its origin in one of the following sources:

THE ABORIGINAL NAME OF THE PLANT, as kinnikinnick (*Arctostaphylos Uva-ursi*), wapato (*Sagittaria latifolia*) and camas (the genus *Camassia*).

HERBAL USAGE, as heal-all (*Prunella vulgaris*) and bone-set (the genus *Eupatorium*).

SOME OUTSTANDING CHARACTER OF THE PLANT, as coral root (the genus *Corallorhiza*), twin-flower (*Linnaea borealis* var. *americana*) and devil's club (*Oplopanax horridum*).

SOME USEFULNESS OF THE PLANT, especially to pioneers, as lodgepole pine (*Pinus contorta*) and scouring rush (*Equisetum hyemale*).

SOME ACTIVITY OF THE PLANT, as tumbleweed (*Amaranthus graecizans*), catchfly (the genus *Silene*) and beggar ticks (the genus *Bidens*).

THE COLOR OF SOME PART OF THE PLANT, as Indian paint brush (the genus *Castilleja*), gold-back fern (*Pityrogramma triangularis*) and white-barked pine (*Pinus albicaulis*).

FRAGRANCE, as vanilla leaf (*Achlys triphylla*) and yerba buena (*Satureja Douglasii*).

TASTE OF SOME PART OF THE PLANT, as bitter-root (*Lewisia rediviva*), peppergrass (the genus *Lepidium*), and licorice fern (*Polypodium vulgare* var. *occidentale*).

CHILDREN'S PLAYFUL APPELLATIONS, often very appropriate, as starflower (the genus *Trientalis*) and pussy willow (the genus *Salix*).

Common names of plants are as truly a part of folk lore as the music, dances, art and legends of any people. As such they deserve to be kept intact to serve the purpose for which they came into being.

Long ago botanists realized, however, that interesting as common plant names prove to be, they are for several reasons peculiarly un-

*Mrs. Carl S. English, Jr., needs no introduction to most of our readers, who know her great reputation as a botanist, lecturer, writer, photographer and authority on our Northwest plants.

suited for use in taxonomic botany. As example of their inadequacy is the fact that through the use of common names it is not possible to indicate plant relationships. Quite to the contrary, considerable confusion has resulted from the all-too-frequent practice of applying a common name that likens the plant to some other form of plant life. For instance, the Oregon grape, which belongs to the *Berberidaceae* or barberry family, is in no way related to the true grapes which belong to the *Vitaceae*. The skunk cabbage falls far short of being a cabbage. The dogtooth violet is a monocotyledonous plant; the true violets are dicotyledonous. Gardeners frequently, with full justification, ask how little plants of *Epigaea* and the smooth-trunked madrona trees can both bear the name, arbutus. The answer is found in the fact that trailing arbutus is merely the common name of the *Epigaea*, and *Arbutus* is the scientific name of the genus to which the madrona tree belongs. Among other plants that are not what their common names indicate may be mentioned the ground pine, poison oak, poison ivy and rattlesnake plantain.

Plants in their carefree, ubiquitous manner recognize no international boundaries, thus subjecting themselves to so many different languages that botanists have had no choice other than to select a common language which all their colleagues could agree to use in naming and describing plants the world over.

In this day of international strife when it is so difficult to find solutions to our world problems, it is encouraging to remember that since August 1865, when the First International Botanical Congress was held in Paris, botanists have been able to bring together representative members of their profession from far ends of the earth to discuss their differences and agreements and to evolve from these discussions, eventually, a set of International Rules of Botanical Nomenclature. This set of rules furnishes the code by which most of the botanists throughout the world today abide. The way was not always tranquil during the evolution of this set of rules. Neither is there complete harmony today. Because tax-

onomic botany is such an inexact science and because it cannot be reduced to formulas or equations, it necessarily involves the human element and depends for its progress upon individual, personal opinions. Because of this circumstance all the more credit is due to the botanists who have helped formulate the International Rules.

Among the principles decided upon as a working basis was the acceptance of Latin as the language to be used in the scientific naming and describing of plants. Seemingly made to order for this purpose, Latin is not only classically definite in its distinction of meaning but also involves a minimum of prejudice in its appeal, being no longer spoken by any people.

Scientific names of all groups such as families, genera and species are usually taken either from Latin or Greek. When taken from any language other than Latin, or formed in an arbitrary manner, they are treated as if they were Latin. Each plant is designated by a binary combination consisting of the name of the genus followed by the specific name. This follows the scheme developed, though not entirely originated, by Linnaeus. His "Species Plantarum" (1753) is designated as the basis for the legitimate publication of names used today for the ferns and higher plants.

Upon discovering what seems to be a new plant, careful study must be made of all pertinent literature and herbarium specimens to determine beyond any doubt that the plant in question really is unnamed. Upon establishing this fact a name is selected for the new entity which seems suitable and in accord with all the rules and regulations. Then it must be established that this name has not already been used for another species within the same genus. This determination is made by consulting the "Index Kewensis," a catalog of all plants known and recorded to date. Supplements of this index are published periodically to keep it as effectively useful as possible.

In order that botanists thereafter may know the exact nature of the plant designated by the new name, a so-called type specimen of pressed material is selected, carefully labeled

as to name, author, habitat, place of collection, date and any other important information and filed in some accessible herbarium. Here it may be examined if this plant or any of its near relatives are subjects of study.

In presenting the newly named plant to the scientific world some medium of publication must be used that is readily available to those persons who will be most concerned with it. A botanical journal or periodical would be suitable; the local newspaper would not suffice. If the writer wishes he may present a description and discussion of his new plant in his own language. This, however, will not fulfill the requirements of valid publication unless he also presents a description in Latin. The metric system is used to express measurements. In this way he can be relatively certain that botanists in any part of the world will be able to make the necessary translation and arrive at approximately the same concept of the new plant.

Specific names of plants usually are derived from one of three main sources:

1. In commemoration of a person who was in some way connected with the discovery, study or development of the new plant. Here in our Northwest such outstanding explorers as David Douglas, Archibald Menzies and Meriwether Lewis are well remembered by various species named in their honor. Good botanical etiquette, though unwritten, dictates, of course, that a botanist refrain from naming a plant after himself.

When naming a plant after a person, the Latin word used may be either substantive in the genitive case, as *Douglasii*, meaning "of Douglas," or as an adjective, as *Douglasianus*, meaning "Douglasian."

In forming a specific name in honor of a person very definite rules are provided for the use of the genitive. When a man's name ends in a consonant, the letters *ii* are added, as in *Douglasii*, except when the name ends in *-er*, in which case a single *i* is added, as in *Breweri*. When a name ends in a vowel the genitive case is formed by adding a single *i*, as in *Tolmiei*. Names of women end in either *-ae* or *-iae*.

Eight

The most recent set of International Rules, while recommending the decapitalization of all specific names, still recognizes the prerogative of those botanists who wish to honor their fellow scientists by capitalizing the specific name given for them. There is much to be said in favor of retaining the capitals because of the amount of information immediately supplied the reader. Those botanists who favor the retention of the use of capitals find comfort in counting Dr. L. H. Bailey as one of their number.

2. The specific name of a plant may commemorate the geographical location of the discovery or distribution of the new species, as *columbiana* for the region of the Columbia River, or *oregana* for the state of Oregon. Geographical names are not capitalized.

The rules request that we avoid the use of little-known or very restricted localities unless the species is quite local in its distribution.

3. The most commonly used method of naming a new plant is by calling attention to some specific character which sets it apart from other members of the genus, as *sanguineus*, meaning blood-red, which would be especially appropriate if all the other known species of this genus were white, or *spinosus*, meaning full of spines, if all the other species were unarmed.

A fascinating rainy-day occupation is found in casually browsing through a list of specific names and their meanings. L. H. Bailey has supplied us with excellent lists of this kind in the front of both his "Manual of Cultivated Plants" and "The Standard Cyclopedia of Horticulture." Old plant friends take on new interest when, perhaps after years of wondering, we finally find out what their names mean.

✓ ✓ ✓

He who knows what sweets and virtues are in the ground, the waters, the plants, the heavens, and how to come at these enchantments, is the rich and royal man.

—RALPH WALDO EMERSON

Arbutus Unedo, in fruit

—PHOTO BY E. F. MARTEN

ARBORETUM SPOTLIGHT

*Strawberry Madrone**

ONE of the most discussed trees found on the Pacific coast is the Madrona. It is frequently looked upon with disdain by those who find it on their property because of an untidy habit of continually dropping debris such as bark and leaves. However, many do appreciate the beauty of form, the ever-green foliage and especially the orange-colored bark of this tree, feeling that these qualities outweigh the obvious disadvantages.

A relative of the Madrona with a perfectly tidy habit frequently seen in coastal gardens is the Strawberry Madrone, *Arbutus Unedo*. It is indigenous to the Mediterranean region and southwestern Ireland.

This is one of the few shrubs which has both flowers and fruit at the same time. One

must qualify this statement as the fruits are those maturing from the previous season's bloom. In late October and through November and December the greenish-ivory flowers appear along with these ripening strawberry-like fruit. From all observations a single specimen will not bear fruit, therefore several plants should be associated within close range to insure cross-pollination.

Generally seen as a large tree-like shrub, *Arbutus Unedo* grows to about 10 feet in height. It often tends to be slender at the base with a spreading head of branches. The broad-leaved shrub is ideal for specimen use or in foundation plantings where height is needed. The medium foliage texture easily combines with other shrubs. Some will be disappointed to learn that the stems are not orange-tinted as in the Madrona. Even though

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*In Europe this tree has been known as the Strawberry tree for at least two centuries, if not longer.



A Heath Is Not Always a Heather

PAT BALLARD *

"There be divers sorts of Heath,
some greater, some lesser;
some with broad leaves,
and some narrower;
some bringing forth berries,
and others nothing but floures."

—JOHN GERARD
from *The Herbal or General History
of Plants*—1579

JOHN GERARD was not thinking of the Heath family when he wrote this description of the "Hather, or Linge," but being a borrower of the words of others he could hardly deny us their use.

A certain innate curiosity, a growing urge to study plants in their family groups, and the hope of discovering new plant material for our gardens started eight Arboretum Foundation members delving into the secrets of the *Ericaceae*. We knew that we were taking on one of the more complex and extensive plant families but we also knew that the Pacific Northwest is climatically and horticulturally hospitable toward the members of this acid-loving group, and this gave us the courage to take our scant knowledge in hand and venture into the maze of botanical information necessary to such a pursuit.

The plan was that we would have a two-hour session each week; at one meeting we would study the books pertinent to the subject, and the next we would spend at the Arboretum searching out the species of that week's genus.

Our first meeting came close to being our last when we were confronted with the terminology so dear to the pens of the experts. All of which means very little unless one has an example at hand, and it wasn't until we had spent some time studying living specimens and had made frequent use of botanical dictionaries and glossaries that any semblance of optimism was regained.

We are very grateful for the patient assistance given us by Mr. Mulligan and other botanist friends. They not only answered our many questions, but also provided difficult-to-find reading material dealing with various members of the *Ericales*, and, while we cannot say that we read these with any great degree of understanding, we did manage to glean bits of valuable information.

What makes the *Ericaceae* different from other plant families? That was our first hurdle and, believe me, we could not take it in one leap—we were still creeping, not soaring.

Webster says, "ERICACEAE, a family of plants, the heath family, typifying the order *Ericales* . . . HEATH, any plant of the heath family (*Ericaceae*)."

The *Ericaceae* differs from allied groups by having leaves with no stipules, stamens usually distinct (that is, not attached to the petals or corolla), by usually having twice as many stamens as corolla lobes, and by having an ovary which is 2- to many-celled.

A more easily understood description of the family is one written by Mrs. Else M. Frye in "Introduction to Rhododendrons" in the March, 1943, issue of the Arboretum Bulletin. She describes the general characteristics as follows: "They are usually shrubs or small trees. They are usually evergreen although the Azalea series of rhododendrons is not and there are other exceptions. The leaves are usually alternate, but sometimes they are opposite as in some wintergreens. The flowers are perfect; that is, each flower contains the necessary reproductive organs—stamens and pistil. The flowers are sometimes regular but often irregular; that is, the petals are not exactly alike. The flowers occur singly or in small or large clusters of various forms. The corolla is usually gamopetalous; that is, the petals are more or less united, forming a tube. The calyx and petals are 4-5 parted; that is, the united calyx and united corolla may have 4-5 lobes on the margin. The fruit is often a

*Mrs. Page Ballard, enthusiastic Program Chairman for the 64 Arboretum Units, is, according to her friends, "if not at home try the Arboretum." The "findings" of this unique group, as reported so excellently by Mrs. Ballard, will be in two parts, the second and concluding article to follow in the Winter 1953 issue.

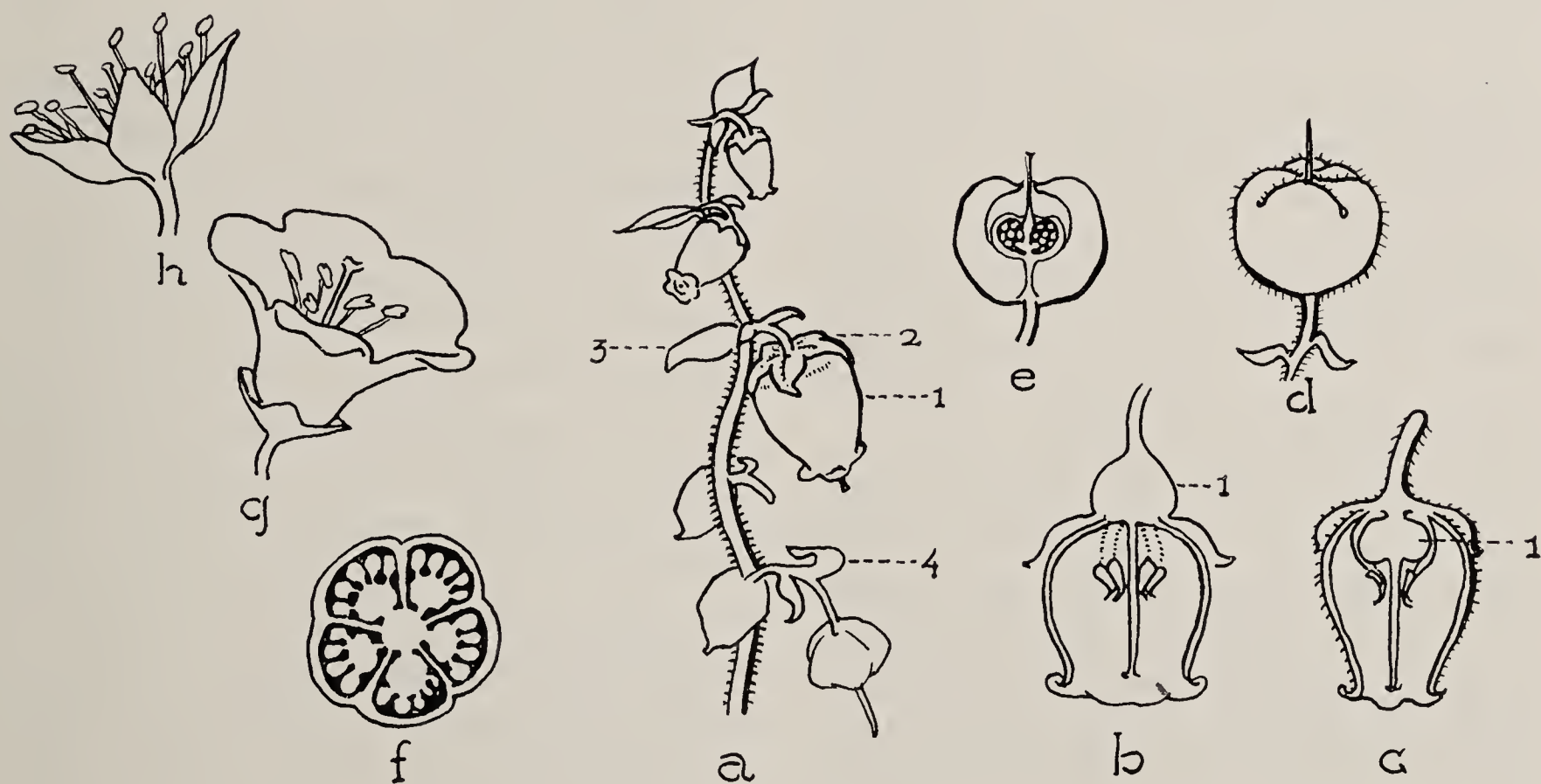
dry capsule but sometimes a berry, as in the huckleberries, wintergreens and pernettyas."

There are five genera in the *Ericaceae* which are not gamopetalous but polypetalous (having separate, not united, petals). They are: *Tripetaleia*, *Elliottia*, *Cladothamnus*, *Ledum*, and *Leiophyllum*. Carl S. English Jr., in an article in the September, 1944, issue of the *Arboretum Bulletin*, says, "It is interesting to note that in the *Ericaceae* occurs the transition from flowers with separate petals to flowers with united corolla."

The heath family is probably as widespread as any clan in the plant kingdom, though when found in the tropics it will be confined to high, cool, mountain areas. Several members, including *Vaccinium Vitis-idaea*, are described as circumpolar, being found in the northern countries around the world. The heaths are not apt to be found in desert situations, but David Wilkie (in an article in the 1952 Report of the

Rock Garden Conference) says that they may someday be found under such conditions because of their faculty of adapting themselves to their environment. He says that "a typical example of this is the ericoid type of leaf where the margins are turned right back to prevent transpiration; this same purpose is similarly illustrated in the closely overlapping leaves of *Calluna* and *Cassiope* and further, in the case of *Pernettya* which has to withstand strong winds and intense sun heat, the leaves are covered with a hard cuticle and are often arranged vertically so that less leaf surface is exposed to the sun's rays."

There are botanists who split the family, forming a second group know as the *Vacciniaceae*, but traditionally it is regarded as one family. Engler and Diels, following Drude, break the heath family into four subfamilies: *Rhododendroideae*, *Arbutoideae*, *Vacciniodeae* and *Ericoideae*.



a. *Gaultheria Shallon*, inflorescence

1. Corolla
2. Calyx
3. Bract
4. Bracteole

b. Section of *Vaccinium* flower

1. Inferior ovary

c. Section of *Gaultheria* flower

1. Superior ovary

d. Fruit of *Gaultheria*

e. Fruit of *G. Miqueliana* showing capsule inside fleshy calyx

f. Cross-section of 5-celled ovary

g. Gamopetalous corolla

h. Polypetalous corolla

—DRAWINGS BY MRS. BALLARD

This is a family which likes humid air, heavy rainfall, and acid soil. Whether they are found in the Eastern or Western Hemisphere, north or south of the Equator, they are apt to be growing under those conditions—and we will find more of them in western Washington than we will east of the Cascades. Among the 70 genera and 1500 species can be found plants for almost any taste: trees with evergreen leaves, like the madrona, *Arbutus Menziesii*; the beautiful branching patterns of deciduous shrubs, like *Enkianthus*; tiny groundcovers with year-round charm, like the gaultherias (*G. ovatifolia*, *G. Miqueliana*, or *G. depressa*); and if you want a display of gorgeous bloom, interesting texture of foliage, and little maintenance—the Heaths certainly have it.

We decided to start on a more or less familiar genus, *Vaccinium*, and hoped that time would bring clarification . . . which hope was soon blighted when we discovered that W. H. Camp had spent ten years studying the Western American bilberries and considers the work on this group of plants really only started. And then we discovered that *Vacciniums* grow from Alaska to Java!

At this point we concluded that, since we had planned to give only one year to the study of the *Ericaceae*, except for the Rhododendrons, we would confine our efforts to those species which could be seen at the Arboretum or in the gardens of this area.

Now three months have passed since that first meeting, and we are taking a second glance at the five genera covered in that time. *Vaccinium*, *Gaylussacia*, and *Chiogenes* are allied by possessing inferior ovaries, by the fruit being berries, and by the persistent calylobes. *Vaccinium* is distinguished from *Gaylussacia* by having an ovary generally 4-5 celled, and *Chiogenes* from *Vaccinium* by having the ovary only partly inferior. *Gaylussacia* is separated from both of its allies by the fact that its ovary is 10-celled and 10-ovuled.

Gaultheria and *Pernettya* are grouped together because of their superior ovaries and unattached, or free, calyces, but these two

genera are separated by the berried fruit of the *Pernettya* and the capsular fruit of the *Gaultheria*, although the latter may frequently look like a berry at first glance.

Vacciniums are popular because of their brilliant autumn coloring, for their attractive fruits (many of which are edible), and some species (evergreen and deciduous alike) for their brightly tinted spring foliage. A. T. Johnson, in "The Woodland Garden," deals with many of the worthwhile shrubs in this group.

There is some difference of opinion as to the derivation of this name. Some authorities insist that it is a corruption of the Latin word *Hyacinthus*, while others say it is probably from the word "baccinum" meaning little berry, and a third group feels sure that it comes from "vacca" meaning cow, since *vacciniums* are often pasture plants.

The *Vacciniums* are of ancient lineage, and inhabit the Northern Hemisphere, with a greater number of species in North America and Eastern Asia.

Gaylussacia is the true huckleberry (our western red huckleberry is *Vaccinium parvifolium*), and not too well known here, though Rehder lists them as hardy in Zones II to V. The genus is confined to America, and contains forty to fifty species, most of them deciduous, but the evergreen ones are intriguing.

The *Gaultherias* proved to be so enchanting that our want-lists grew longer at each new species we found. We were surprised to learn that, botanically speaking, the fruit of the *Gaultheria* is not a berry but a capsule. It is the calyx of the *Gaultheria* which is fleshy in texture and gives the effect of a berry, but actually there is a minute opening at the outer end, and the fruit, or capsule, is found inside.

"The Classification of the Asiatic Species of *Gaultheria*," by H. K. Airy-Shaw, gave us the arrangement of those *Gaultherias* by use of the following characters:

- A. Leaves broadest below or above middle (ovate or obovate).
- B. Inflorescence perulate or eperulate at base (scaly or not scaly).
- C. Flowers racemose or solitary.

- D. Pedicels bibracteolate at base, middle, or apex, or bracteoles several, scattered.
E. Corolla campanulate or urceolate.

"By taking these characters in various combinations, it is possible to establish five major groups of species (comparable to the Series in the genus *Rhododendron*) . . . The shape and nervation of the leaves, and the structure of the inflorescence, appear to give the best characters for groups, the position and number of the bracteoles being particularly important." Mr. Airy-Shaw includes in this study four of the North American *Gaultherias* which he believes are closely allied with the Asiatic species.

There seems to be some confusion in placing some of the *Gaultherias*, due to their similarity to certain of the *Pernettyas* and *Leucothoes*; and *Chiogenes* is thought by some botanists to be a *Gaultheria* and by others to have a close leaf-anatomy with *Pernettya*. In "The Journeys and Plant Introductions of George Forrest" we read of a controversy which has arisen over the true identity of *G. Forrestii*. The plant which won the Royal Horticultural Society's Award of Merit in 1927 under that name is now thought to be *G. tetramera*. It seems likely that some confusion will reign in this genus until a thorough revision is made.

Pernettya is a genus of about 25 species which grow from Mexico to the Magellan regions and also in New Zealand and Tasmania. They are low-growing, evergreen shrubs which do very well when planted with rhododendrons and azaleas.

Gaulthetia (*Gaulnettya* Mulligan) is a spontaneous bigeneric hybrid between *Gaultheria* and *Pernettya*. Photographs showing flowers, leaves and fruit of the parents and hybrid are shown in an article, "*Gaulnettya* x *Wisley Pearl*" by B. O. Mulligan, U. of W. Arboretum director, in the March 1939 issue of the *Journal of the Royal Horticultural Society*. It is interesting to note that fruit differs from that of both parents by having a fleshy calyx about half as long as the fruit.

The University of Washington Arboretum has some twenty-three species and varieties

of the genus *Vaccinium*, twelve of *Gaultheria*, one *Gaylussacia* and five of *Pernettya* (three of these being variations of *P. mucronata*). Many of these would make very usable garden plants, though some of them are still unobtainable commercially. Some of them are still on the doubtful list from the standpoint of hardiness, but some day we will be growing many of these attractive heaths in our own gardens.

Gerard was right. "There be divers sorts of Heath . . ."

(To Be Continued)

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1 1 1

He that can draw a charm

From rocks, or woods, or weeds, or things that seem

All mute, and does it—is wise.

—BRYAN WALLER PROCTER

Foster's Island, a Bird Sanctuary

EMILY HUDDART HAIG *

SEATTLE is indeed fortunate that the University of Washington Arboretum Board has set aside the area known as Foster's Island as a wild bird sanctuary. The Seattle Audubon Society is deeply grateful for this kind consideration of their request.

An arboretum is an ideal situation in which to attract various species of bird life due to the variety of plant life and arboriculture included in the over-all pattern. Evergreen conifers, deciduous trees and low-growing shrubbery play an important part in the lives of birds according to the habitat and food requirements of each species.

A desirable habitat is as important in attracting birds as trees or shrubs supplying food. Insects form the largest proportion of the food requirements of birds and so become a valuable ally for man. These supply the necessary protein but a balanced diet includes vegetables and minerals in some form so that berries, fruit and seed pods are invaluable.

It is interesting to note that Foster's Island, now to be used to protect bird life, has been the haven for some one hundred ten resident and migratory species of birds observed over the years. The author alone has observed some ninety-two species in the last three years. This does not include the Arboretum proper where additional kinds have been observed. This includes waterfowl, land birds, waders, and birds of the air.

Foster's Island lends itself as a desirable habitat for many species due to several conditions. Surrounded by water, the tule area, the wild growth adjacent to the water, the conifers, deciduous trees, brush, berried shrubs and trees both native and planted, and open spaces covered with grass.

Puget Sound attracts some 296 different species of birds so it is encouraging to realize that almost half of this number come to the Island. In time, with proper protection and

encouragement, this area will become one of the most interesting bird areas west of the Cascades.

Future plantings by the Arboretum may take into consideration both habitat and food for bird life. At present there are a number of desirable trees and shrubs on the Island. I will list some of the trees and shrubs as contained in our own "Field Guide to the Birds of Puget Sound" by Earl J. Larrison.

ALDER (*Alnus rubra*). Goldfinches and especially siskins are attracted by the aphids on its leaves and the birds also eat the seeds from the cone-like fruit.

CASCARA (*Rhamnus Purshiana*). Shiny black berries eaten by black-headed grosbeaks, robins, thrushes, waxwings, vireos, towhees, tanagers, band-tailed pigeons, purple finches, song sparrows, and downy woodpeckers. Tree usually covered with aphids which are eaten by hummingbirds, vireos, all warblers, finches, sparrows, towhees, juncos, bushtits, chickadees, flycatchers, kinglets, goldfinches, siskins, nuthatches and wrens.

CHOKECHERRY (*Prunus demissa*). Usually come into bearing after the cascara berries are gone and the fruit is eaten by waxwings, robins, tanagers, black-headed grosbeaks, woodpeckers, sparrows (and the chipmunks which will eat right along with the birds). In late winter and spring, the pits are cracked for the meats by evening grosbeaks which come in large flocks for them.

SALAL (*Gaultheria Shallon*). Blue berries eaten by sparrows, towhees, purple finches, russet-backed thrushes and chickadees (for the seeds).

SALMON BERRY (*Rubus spectabilis*). Pink berry eaten by sparrows, towhees, robins and thrushes. Nectar of flower sipped by hummingbirds and butterflies.

SNOWBERRY (*Symphoricarpos rivularis*). Berry attracts grouse, evening grosbeaks and thrushes.

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*Mrs. Neil Haig is President of the Seattle Audubon Society and Bird Chairman for the Washington State Federation of Garden Clubs.

New or Unusual Plants in the Arboretum

B. O. MULLIGAN

(Continued from Summer, 1953, edition)

2. *Hydrangea strigosa* var. *macrophylla*

Of the few truly summer blooming shrubs in the Arboretum this is unquestionably one of the most notable and conspicuous. For length of flowering season probably only the Spanish Broom (*Spartium junceum*), *Hypericum* "Rowallane Hybrid," and *Ceanothus* "Gloire de Versailles" could be placed in the same class at this season, but in size of leaves and flower heads it much exceeds all these.

Our records show that the first flowers usually open between July 14 and 20 (a little earlier this year) and full bloom is from the latter part of July to the middle of August—about a month in all during the warmest part of the year.

The situation where it was planted in May, 1947, is at the head of Rhododendron Glen, close to the Upper Road, faces east and is well sheltered from the prevailing southwest wind

by native western red cedar, hemlock and cascara trees, and surrounded by rhododendrons of Series *Ponticum* both on the north and west.

Our single original plant, now some 9-10 feet in height and width, was derived from seeds received from the Royal Botanic Garden, Edinburgh, Scotland, in May, 1941. It has not proved easy to propagate, since viable seeds have never been obtained, and the amount of suitable wood produced annually for cuttings has been small. However, a few young plants have been raised in this way, and one of them, now about 3 ft. tall, was placed beside its parent this spring. The soil is light and sandy, but well mulched with

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(Below)

Hydrangea strigosa var. *macrophylla*
Flowering in the Arboretum in early August, 1953

—PHOTO BY E. F. MARTEN



Oxford Botanic Garden

G. W. ROBINSON *

THIS delightful old garden, the oldest botanic garden in Britain, was founded by the Earl of Danby more than 330 years ago. He was a direct descendant of Roland d'Aleus who came over from Normandy with the Conqueror and took part in the Battle of Senlac (Hastings) in 1066. As always in war, the conquered people, particularly the nobles, were stripped of their possessions and their property shared out amongst the victors. D'Aleus, for his services and his bravery, was granted property in Oxfordshire and his family intermarried with other similarly placed local families. By the sixteenth century the family name had become changed to Danvers and the head of the family, on the accession of King Charles, was created first Earl of Danby. He also became Ranger of Wyckwood Forest and Keeper of Cornbury Park (his home)—obviously a person of some importance in this part of the country. He "being minded to become a benefactor to the University, determined to begin and finish a place whereby learning, especially the faculty of Medicine, might be improved." He bought out the tenant of five acres of meadow just outside the East Gate of the City, opposite to Magdalen College, and transferred the lease to the University. The opening ceremony was held on July 25, 1621, within a few months of the arrival of the Pilgrim Fathers in America. By November of that year instructions had been given to the masons to make the garden wall "well fair and sufficient" as well as "the fairest buildings in Oxford both for truth and beauty." They carried out their task thoroughly, and today they are still fine old walls bearing as varied a collection of "climbing" plants as can be seen anywhere in Britain. The construction of the Gateway was not completed until 1632 but the result was a solid job. It is still in good condition and frequently used by both architectural and art students. The statues on the northern face are

of Charles I and II, and the bust of the founder whose name the Danby Gate perpetuates.

The garden owes much of its charm to the ancient gateways and walls and above all to its setting, bounded on the east by the River Cherwell and on the south by the extensive Christ Church Meadows. It is indeed difficult to realize when walking in the garden that only a stone's throw away is the "High," one of the most traffic-congested streets in the city.

From a purely horticultural point of view the walls are of immense value. Two of them give opposite sides, north and south, east and west aspects (the north wall is completely screened by the buildings and the outer side of the eastern wall is occupied by the range of glasshouses). Planted against them are subjects not too hardy with us, such as *Ceanothus*, *Buddleias* and *Vitis* in variety. A few of the really old climbing roses still find a home here, climbing Boursaults and Chinas, for example, and the Seven Sisters rose; rather more modern are Chaplin's Pink and Paul's Scarlet, both of which are so striking that they can be identified a quarter of a mile away. One of the most beautiful varieties is Climbing Elegance with pale yellow flowers.

On this southern wall also *Chimonanthus fragrans* is a fine sight in January, in February *Chaenomeles* varieties follow and somewhat later the Californian *Ribes speciosum*. Both of the latter are helped tremendously in their effect by contrast with the grey stone of the walls.

It might be expected that the north aspect would prove difficult to furnish but this has not proved so. Here *Choisya ternata* reaches about 10 ft. in height and flowers freely and regularly, *Hydrangea petiolaris* covers 12-15 ft. of wall space and flowers annually, as do also the old favorites *Berberis stenophylla*, *Forsythia suspensa*, and *Jasminum nudiflorum*.

Two Azaras are flourishing here also: *A. microphylla* and *A. Gilliesii*, but a severe winter

*Mr. Robinson is Curator of this historic and famous old Botanic Garden.

punishes them badly; *A. lanceolata* is even less hardy.

The Botany Buildings also present us with a warm southern aspect and this has been utilized to carry a collection of *Clématis*, both species and garden varieties. Two old Magnolias, *M. denudata* (a fine old tree) and *M. grandiflora*, also well repay this sheltered situation. The old "library" building is completely covered in *Ampelopsis* and is a wonderful sight in the fall, even though for a rather brief period.

Trees are few—for the simple reason that there is not the space available. By far the finest specimen we have is the old *Sophora japonica*. This is 17 ft. in girth at breast height, and some 80 ft. in height with a spread of over 100 ft. It was planted about 1817.

An old male *Ginkgo* was recorded as having a trunk 1 ft. in diameter in 1838. It is now 7 ft. 5 in. in girth, a fine specimen and well placed in relation to other trees. Three *Sorbus* are also fine old trees. The *Sorbus rotundifolia* must surely be one of the finest examples of this species. Both the apple- and pear-shaped forms of *S. domestica* also are worthy of attention. The apple-shaped variety, *S. domestica* var. *maliformis*, colors magnificently in autumn, both foliage and fruit, is 6 ft. 10 in. in girth and 60 ft. in height, and reputed to have been planted by John Sibthorp (Professor of Botany, 1784-96).

Old trees remain also of *Ailanthus* and *Gymnocladus dioicus* (*canadensis*). The latter was planted in 1835. Conifers are not well represented but there are typical old specimens of *Pinus austriaca*, *P. nigra*, and *P. excelsa*, and a good old *Taxodium distichum*. *Torreya californica* is making a good tree, and the latest recruit, *Metasequoia glyptostroboides*, is a promising stripling some 12 ft. high.

The shrubs are as representative as is possible in a limited area. *Berberis* are particularly good, as many of them are types or syntypes authenticated by Dr. Leslie Ahrendt, who is the recognized authority on the family in this country. Species of roses, *Cistus*, cotoneasters and many other genera are planted

in groups of one genus. As might be expected, through three centuries there have been quite a number of changes in planting and arrangement. The earliest published plan of the garden, Loggan's plan of 1675, was of geometrical type and as a Physic Garden the chief interest was of course in medicinal herbs. The original main paths north to south and east to west still remain. Another feature of interest on this plan was the Conservatory, a slate-roofed building of the orangery style.

A later plan, Williams' of 1733, shows a considerable amount of topiary work, the layout still being formal and geometrical but without any large trees. By the beginning of the 19th century a geographical arrangement had been adopted, and trees and shrubs were included; British and European to the east and North American and Asiatic on the western half.

About a century ago Natural Order beds were planted, though some of the trees were retained; both the systems recognized at that time were used, the "Linnean" on the eastern half and the "Natural" system on the western. In 1884 Professor I. B. Balfour was appointed and two years later the whole of the beds were remade, the Bentham and Hooker system being adopted. This is still in use, and the formal rectangular beds contain a very extensive range of herbaceous material.

Old records of the greenhouses show that they must have been among the earliest of their kind. Two of them still exist though they have long been used for other purposes. They were built with thick stone walls and facing south. In very severe weather a four-wheeled wagon was filled with burning charcoal and drawn backwards and forwards along the path by the gardener. There is an illustration of this primitive method of heating in the "Gardener's Chronicle," 1885. The first wooden greenhouses were in use from 1734 till 1834. The brickwork of the existing range dates from 1893 though the woodwork and glass have been renewed in recent years. Seven of the houses are open to the public in the afternoons, the remaining two being used for prop-

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Shrubs for the Rock Garden

MRS. CONNER E. GRAY *

THE ideal shrub for the rock garden should present a good appearance the year around. Gaultherias are a good example of this. Their urn-shaped flowers are usually white and not too noticeable, but the majority of them produce large berries in shades of white, pink, blue or the red of our own *G. procumbens* from the Eastern states.

G. Miqueliana, a round compact shrub, twelve inches high, is covered with large white berries which fade pink and delight the eye for a number of weeks. *G. hispida* has the same berries but its habit is looser and it is a somewhat larger plant. *G. nummularioides* is dependent on its small, round leaves and its creeping habit for its charm, as its brownish urn-shaped flowers and tiny berries are securely hidden. *G. ovatifolia*, from our own mountains, is another good ground cover, though very shy with its small red berries when transplanted into gardens.

G. Itoana has such dainty leaves it can almost masquerade as a fern. So far it has not flowered for me, nor have I been able to find a description of it. This is only a small sample of the many Gaultherias available and they are quite easy though very slow from seed.

Daphnes not only present us with good foliage, but with an abundance of flowers in spring and a sprinkling all through the summer. *D. Blagayana* rambles around among the rocks, throwing up stems with bunches of cream-colored flowers. It thrives on a mulch of stones and leafmold. *D. Cneorum* is a more compact shrub about twelve inches high. It is covered with rose-colored flowers in spring and again in fall, and also fills the air with a delightful fragrance. It needs a heavy mulch of leafmold every year, and when it gets temperamental, shearing it back to the ground will give it a new lease on life. *D. retusa* is a very slow-growing shrub, with dark green, heavy textured leaves. Its flowers are very

waxy, white inside and flushed with purple on the outside of the petals. *D. sericea* is covered with reddish-purple flowers in the spring and a few in the summer. It is very easy and every cutting will grow. Of course the gem of the race is *D. petraea grandiflora*; it can sometimes be obtained in Vancouver or Victoria, B.C. My plants faded away before they bloomed. I have read that grafted plants bloom earlier and are easier to grow than those on their own roots.

Acantholimons make dense spiny cushions and like hot and dry sunny positions from which they should never be disturbed. The species *glumaceum* has dark green mats with short spikes of rose-colored flowers, while *venustum*, one of the loveliest, has spiny silver-gray cushions and long arching sprays of clear rose-colored flowers.

Arctericia nana is a very dwarf evergreen with small hard leaves and little white flowers resembling bell heathers; it only grows two or three inches high and enjoys a cool, moist, shady spot.

Arctostaphylos media grandiflora has larger pink urn-shaped flowers than the type and *A. nummularia* is another good small shrub with white flowers. There are numerous others, but most of them are either too tall or too invasive for any but the large rock garden.

Carmichaelia Enysii makes a slow-growing mat four inches high of flat green stems devoid of flowers, which should be bluish and pea-shaped.

Epigaea asiatica and *E. repens* are very difficult plants. They are similar in appearance, with creeping twiggy stems and comparatively large leaves. *E. asiatica* has deep pink tubular flowers, while our own *repens* has white or light pink bells but makes up for its lack of color by its delightful fragrance. They require deep shade and a very acid soil. Transplant them while young and protect with a cover of pine needles until well established.

Erinacea pungens has stiff stems and sparse gray foliage. It grows very slowly and requires

*Mrs. Conner E. Gray, a staunch member of the Northwestern Branch of the American Rock Garden Society, is both a collector and successful grower of native and other mountain plants in her Seattle garden.

age to produce its blue pea-shaped flowers.

Daboecia azorica is another gem somewhat difficult of cultivation. It probably needs to be planted in the protection of a large rock which will partially shade it. It forms a compact evergreen shrub four to six inches high and covers it with lovely crimson bells during May and June.

Dryas octopetala has been called the most charming of all rock garden shrubs, but a very dwarf form discovered on Mt. Hood by Mrs. Gale of Portland is so very much more attractive that I have discarded the type. It makes flat evergreen carpets of wee oak leaves bespangled with little white dog roses at intervals during spring and summer. The flowers are followed by fluffy silvery whorls of seeds.

Kalmiopsis Leachiana is a comparatively new shrub, discovered in the Siskiyou Mountains in Oregon by Mrs. Leach. It grows about a foot high and at the Arboretum and in Carl English's garden is covered with deep rose *Kalmia*-like flowers each spring. It was propagated by thousands in a Portland nursery until it proved so difficult. Now it is hard to discover even a single plant to experiment with.

Leiophyllum buxifolium, an Eastern native, is an enchanting shrub, less than a foot high, covered with very small dark green evergreen leaves. It does well in a cool sheltered place and covers itself with minute white flowers, the unopened buds being pink. *L. buxifolium prostratum* is about half its height and is lovely cascading over a rock. *Lithospermum prostratum*, "Heavenly Blue" and the newer and better variety, "Grace Ward," are among the most favored shrubs. They must be transplanted when small or from a pot. Eventually they cover a yard in space and require a severe cutting back in the spring. If given plenty of leafmold and no lime they will be gorgeous mats of blue in spring with a sprinkling of flowers throughout the year.

The Phlox family has two plants that add to the pleasure of the rock garden. *Phlox* "Vivid" has small salmon-pink flowers with deeper colored centers and needs full sun.

Phlox adsurgens from southern Oregon usually grows under fir trees and is an entirely different plant. Its evergreen leaves are about one-half inch long and the unusually large flowers range in color from almost white to a deep salmon pink. The flowers cover the plant for a number of weeks and the small side shoots root very quickly.

In most rock gardens there is some corner where the water drains from higher levels. Dig out twelve inches and fill it with peat moss and a little sand. In this corner some of your greatest treasures will thrive.

Loiseleuria (Azalea) procumbens, which sulked in my garden for three years, has tripled in size and is covered with its minute pink flowers every year. Two types of *Vaccinium Vitis-idaea minor* are running all over my three-foot corner. The one from Canada is about four inches high, has white flowers and red berries. The other from Mt. Washington has lovely pink flowers, grows only about two inches high and does not set berries. Towards the back of the bog is a two-inch ledge held up with the crooked limb of a tree. On this *Pernettya tasmanica* thrives and produces its large rose-colored berries every year. *Phyllothamnus erectus* (a bigeneric hybrid between *Phyllodoce* and *Rhodothamnus*) which is like a *Phyllodoce* larger in all its parts, thrives on the edges, and a very dwarf *Rhododendron racemosum* produces seedlings nearly every year.

I have purposely left out the dwarf Conifers which usually outgrow their positions, but are so intriguing if one has the courage to eliminate them when they become too large.

The dwarf Rhododendrons should all be grown, and *R. Williamsianum* in its creeping form is still one of my favorites, even though I am still waiting for old age to produce its lovely pink bells.

These shrubs are obtainable either here or in British Columbia, though you will have to develop the patience and love of a collector to find them. The satisfaction of adding one more treasure to your collection will amply repay you for your trouble.

Winter and Spring Blooming Heaths

ARTHUR P. DOME *

THE Winter blooming heaths are beyond a doubt the most valuable friends the gardeners of the Pacific Northwest can introduce into their gardens. These popular, versatile plants are enjoyed for their neat habit of growth, both with the low-growing rockery types and the tall tree heaths. With proper selection, one can greatly increase the beauty of his yard by profiting from the profusion of bloom these plants produce during the dull winter months.

Of these shrubs we find *Erica mediterranea hybrida* or *darleyensis* heath the most known and used. This is beyond a doubt the most rugged and versatile plant we have, growing and flowering well in almost any type of soil. It grows from one to two feet tall and flowers from October to March with light pinkish-purple blooms. In the past few years its white counterpart, *hybrida alba*, has been widely grown and is equally hardy, producing an abundance of clear white flowers. Some of the gardeners in this area have been able to obtain the new improved form, "George Rendall" which, with the same growing conditions, stays more compact and produces clearer, deeper-colored flowers.

E. carnea "King George" also can flower from October to March, producing a mass of light red blooms that turn deeper as the season moves on. This might be a more desirable plant for the smaller garden because it grows slowly, stays compact and seldom needs trimming.

Those who are favored with the warmer gardens can enjoy *E. lusitanica*, which will grow to a height of seven feet. This plant starts flowering, as a rule, in December and continues on through February with its graceful, plume-shaped branches covered with a multitude of blooms. When in bud the flowers are rose-colored and as the bloom matures it fades to a soft white.

Two others that do well in the warmer gardens are *E. australis* and its variety "Mr. Robert." These shrubs will grow to six or eight feet tall and produce unusually large blooms for hardy heaths that grow outside in this area. During the average season they will flower from February through April, at which time I have cut blooming sprays up to two feet long. *E. australis* has large pinkish flowers, but its variety "Mr. Robert" is really a garden aristocrat, producing its large waxy-white flowers at the tips of each branchlet in such profusion that one hardly notices its clean, bright green foliage.

At the turn of the year we have more members of the *E. carnea* group coming into flower with many of them lasting through April. The most popular and widely used is "Springwood," which grows only six inches tall and produces a mass of white blooms that are quite effective in large plantings. Equally desirable, but a little more difficult to obtain, is "Springwood Pink" with its delicate pink flowers that are shown in the same abundance. Two other plants of this same group that are quite worth growing are *E. carnea Vivellii* and "Ruby Glow." The former has carmine-red flowers and a dark ebony-colored foliage, while the blooms of the latter are a little brighter in color and contrast very well with its deep olive-green leaves. These plants are at their best when on a slope or bank for they do not grow high enough to show their blooms off well when placed in flat beds or shrubbery borders.

About the first of February we have *E. mediterranea* and its varieties coming into flower. This will form a columnar shrub which grows up to five or six feet tall, and also produces long sprays of light pinkish-purple flowers that are quite suitable for cutting. The two varieties most easily obtainable in this area are *E. med. hibernica* "Brightness" and *hibernica alba*. "Brightness" has pinkish-lavender flowers and, as the name

*Mr. Dome is one of the leading growers and authorities on heathers in the Puget Sound area and has been a previous contributor to the pages of the Bulletin.

implies, *alba* has white. Both of these plants are very compact, erect, slow-growing shrubs that will in time reach a height of two feet, and are so floriferous that when in bloom the flowers practically blot out all view of the foliage.

In March and April *E. arborea* is showing color. This plant will send its stiff yet bushy branches up eight or more feet and produce an abundance of small, dainty white blooms. When in flower it makes its presence known in your garden by emitting a very sweet fragrance, and if you happen to disturb it you will find yourself engulfed in a cloud of pollen. *E. arborea alpina* is not as common in this area and differs from the type in that the flowers are not fragrant but perhaps a little clearer white, and may last a little longer. As for the physical difference between the two we find that the variety *alpina* has a lighter green foliage when both are grown under the same conditions; it also is much hardier.

During April and May, as the blooms of the foregoing plants begin to fade, the rare and desirable *E. umbellata* comes into bloom. This plant will grow to about a foot and a half high, being entirely covered with a profusion of rosy-lavender flowers at a time of the year when many gardeners are looking for a plant to tie the winter blooming varieties in with the late spring and summer flowering types. *E. umbellata* is more difficult to propagate and not too rugged a grower, but those who succeed in cultivating it will agree it is well worth the effort.

However, most varieties of winter flowering heaths are not hard to grow for they require very little care and attention. Finding the right location is most important. Generally speaking, give them all the direct sunlight you can for this helps prevent them from growing into a loose, leggy plant and induces more flowers.

As for soils, it is best to give them a friable, lime-free loam but, as in most groups of plants, different species have different tolerances. Those gardeners with a heavy soil, that might be on the alkaline side, will find that plants of the *E. carnea* and *E. mediterranea*

groups, with their hybrids, will do quite well. *E. arborea* and *E. lusitanica* enjoy a medium-heavy lime-free soil, while *E. australis* and *E. umbellata* should have a light, lime-free loam. In planting, the more peat or humus you can put into the soil the more you will be repaid for your effort. This will encourage a greater root system and promote better bacterial action.

In growing all shrubs of this type, a little "acid" fertilizer in the spring is always beneficial but for those plants that seem to lag as the season moves along we find that a good soaking with a liquid fish solution, such as one with a 10-6-5 analysis, will usually correct this. Care should be taken to avoid a great amount of late growth, for a well-hardened shrub is much better prepared to withstand the rigors of a cold winter, whereas if the plants continue to grow and stay soft up to the time of frosts they may be nipped. One may go a long way towards preventing this by slackening off the amount of water late in the year, but do not let them get parched. If this does not work for you, then you may have to resort to using a non-nitrogenous fertilizer, that is, one containing principally phosphorus and potash, such as 0-13-20 analysis.

Pruning and trimming is another procedure that goes a long way toward keeping these plants desirable garden subjects. The taller heaths should be pruned back quite severely with hand clippers in the spring, after all danger of a heavy frost has passed, to prevent them from becoming bare and leggy. Some of the lower-growing types, such as the different hybrids of *E. mediterranea*, should be sheared back with hedge shears so they won't become loose and unsightly, while *E. umbellata* and varieties of *E. carnea* need only be pruned to keep them in bounds. This should be done just before the new growth starts and as the flowers fade.

Those of you planning on using these heaths in your winter garden might go around and see how others have used them. In deciding which are best for you, consider the soil con-

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To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears and previously established \$2 memberships more than thirty days in arrears will be dropped and THE BULLETIN will be discontinued.

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All memberships are non-assessable.

Notes and Comment

Little Garden Club of Pasadena becomes the first Group Life Member of California Arboretum Foundation.

We wish to quote from a letter from Mrs. Alan F. King, president of the Little Garden Club of Pasadena, regarding the inspirational way in which this club, with relatively few members, raised the funds for their life membership (of \$500.00):

"For the past two years the Little Garden Club of Pasadena has had as its project the achievement of a life membership in the Los Angeles State and County Arboretum. Just this month (i.e. March 1953) sufficient funds have been accumulated to accomplish this goal.

"You may be interested to know that this amount represents 'earnings' of our members rather than direct donations. The initial contributions to the fund was the residue from a previous club project which was the printing and sale of a garden calendar. To this was added little by little the contributions of individual members as each was collected. Each member was responsible for her own personal project. These covered a wide variety of activities: making and sale of card-table covers, woodcraft products, barbecue accessories, Christmas wreaths, sale of garden supplies on commission, donation of services for a club program, and several others not so easily catalogued."

To the Little Garden Club of Pasadena, a heartfelt life welcome to California Arboretum Foundation.

—*Lasca Leaves*, Los Angeles State and County Arboretum (Summer 1953).

‘ ‘ ‘

A notable recent acquisition to the Arboretum library has been the two folio volumes of "The Genus Rosa," by Miss Ellen Willmott, published in London by John Murray in 1914, containing 130 color plates drawn by Alfred Parsons, bound in half green calf. This is one of the most beautiful as well as useful works of its kind, and for it we are greatly indebted to the members of the Else Frye Unit No. 8, who contributed funds for its purchase.

Excerpts from "The Garden," Journal of the New York Botanical Garden, in reports presented at the annual meeting of its members:

"For the first eleven months of this fiscal year, the total gifts to the Garden were over \$290,000 compared to \$70,000 for the same period last year." . . "We also received a gift of greenhouses and garden material valued at more than \$40,000." . . .

"During the past fiscal year, the Volunteer Associates received contributions in excess of \$1,500 for the decoration of the downtown Members' Room and \$5,000 for displays and renovation of the Exhibition Wing of the Museum. It realized \$10,000 from the Theater Benefit, arranged by two of the members."

For the past seven years the Arboretum's projector has been kept busy through the fall, winter and spring months showing slides of the plantings, individual specimens of trees and shrubs, and closer views of their flowers to many garden clubs, Arboretum units and a variety of other groups, not only in the Seattle area but throughout the western part of the state and even in British Columbia.

Now we feel that a newer, more efficient type has become necessary, but in case any club or other group wishes to assist in relieving the Arboretum's reduced budget of some of the cost of a new model (\$86.00 with a 5-inch lens, or \$122.00 with the addition of a very useful 7½-inch lens) we are mentioning the need here. The director, Mr. Mulligan, would be happy to supply more details if required.

The account of the Winter Garden at the Arboretum, written by Mr. Mulligan at the request of the editor and published in the "Journal of the California Horticultural Society," April 1953, is available in reprint form from the Arboretum office, price ten cents.

The Arboretum Foundation and the College of Forestry of the University are jointly hoping to sponsor a meeting late in October at which the noted Plant Doctor, Miss Cynthia Westcott of Glen Ridge, New Jersey, will be

the speaker. Further details will be published later.

A five-color map of the University of Washington Arboretum indicating major plantings, location of paths, etc., is available through various Arboretum units and at the Arboretum office. Price 50c.

Arboretum Spotlight

(Continued from Page Nine)

no fruit is found on a single specimen the plant does not lose any of its landscape value.

The ideal site situation seems to be one in full sun with a light, well-drained soil amply supplied with humus. Moderate seasonal watering should be practiced. If maintained under lush growing conditions there is a great danger of the shrub being cut back or even killed to the ground in severe winters.

There is a planting of Strawberry Madrone on the bank of the south parking area at the head of Rhododendron Glen. Of the eight specimen shrubs in this planting only one, at the north end, fruits heavily, while several others only sparsely. Here is a shrub worthy of research into its fruiting habits and the Arboretum can make studies to determine further the setting of fruit. Such a contribution will be of value to both nursery and gardener alike.

—R. J. HANSEN

RECENT ACQUISITIONS TO THE ARBORETUM LIBRARY SPRING AND SUMMER, 1953

American Trees, A Book of Discovery, by Rutherford Platt. Dodd, Mead and Company, New York, 1952. Gift from Else M. Frye Unit No. 8.

The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada, by Henry A. Gleason; The New York Botanical Garden, 3 vols. 1952. Gift from Faculty Wives Club, First Garden Division.

A Natural History of Western Trees, by Donald Culross Peattie; Houghton Mifflin Company, Boston, 1953. Gift from Herbert Ihrig Unit No. 61.

Modern Gardening: A Complete Guide to the Agricultural Uses of Modern Chemistry's Miracle Drugs, by Dr. P. P. Pirone; Simon and Schuster, 1952.

Journal Kept by David Douglas During His Travels in North America, 1823-27. Published under the direction of the Royal Horticultural Society; William Wesley and Son, London, 1914.

Hollies, by H. Harold Hume; The Macmillan Company, 1953.

Conifers in Britain, by B. Alwyn Jay; Adam and Charles Black, London, 1952.

BOOK REVIEWS

"The Heather Garden" by Fred J. Chapple. 180 pages, 54 photographs, 4 line drawings. Transatlantic Arts, Inc., Forest Hills, New York (1952), price \$4.50.

THOROUGHNESS of treatment is a concise summary of *"The Heather Garden"* by Fred J. Chapple. Here we find the essence of twenty-five years of experience gathered together in a volume of less than two hundred pages, in which a practical gardener writes in an entertaining fashion concerning more varieties of heather than we would think one person could learn to know in a lifetime. The various facets of the subject receive unhurried but condensed treatment, with considerable expression of personal opinion by Mr. Chapple, who thus embellishes a barren treatise until it becomes a living entity.

The enumeration and description of varieties is enhanced by suggestions for culture, for propagation, for landscape design utilizing heather, for association with related plants, and for economic uses of heather. *"The Heather Calendar"* of the final chapter augments the information given after individual listings and provides excellent reference lists, so complete as to be almost discouraging to the novice gardener who has only slight acquaintance with this group of plants.

A sufficient number of illustrations appears, and of such variety, as to widen the scope of our knowledge about heathers. Individual plants, groupings of a large number of one kind or of several kinds, and sketches of garden design are some of the categories into which these illustrations fall.

Whatever question one may have concerning the Heather Garden, he will surely find some answer in these pages. Should one be interested in derivation of names or origin of plants, how to plant or how to prune, what heather to use for a hedge or for a rockery—Mr. Chapple's data will be useful and his opinions stimulating. His experience has been garnered in a climate similar enough to that of the Northwest to make his conclusions of a special interest there.

Each chapter heading is followed by a quotation, some in verse and some in prose, apropos of the subject at hand. Only an author completely at ease with his theme could approach it from all directions so adequately. Here is a book for good reading as well as for continuous reference.

FRANCES KINNE ROBERSON

✓ ✓ ✓

"American Trees"—A Book of Discovery, by Rutherford Platt. Dodd, Mead and Company, (1952) price \$3.50.

THIS book is so written as to make interesting the study of the living trees about us. There is a gradual unfolding of facts and associations about the various trees so that one is led to delve further into their lore. The approach in most cases is to reveal outstanding characteristics of the trees, actually, obvious facts, yet often overlooked in a more technical study. In some instances it seems the thought is to renew old associations known to a particular tree. Numerous line drawings visually accentuate facts of the text.

Twenty-four

It is apparent then that the style of this book is not technical nor botanical, so it should have a wide appeal to many who are only casually interested in trees.

The book is most comprehensive for it includes all types of trees of every region of the North American continent. This is a feature overlooked in such books. Abundant photographs—a few in color—illustrate many plant characteristics such as buds, flowers, fruit, leaf, bark, branching pattern and tree form.

ROBERT J. HANSEN

✓ ✓ ✓

"Modern Gardening" by P. P. Pirone. Simon and Schuster, New York, 1952. \$3.50.

"MODERN GARDENING" is a clinical report. It is concerned with the hazards of gardening, not its pleasures. Dr. Pirone, who is Plant Pathologist at the New York Botanical Garden and the first practicing plant doctor in America, is well qualified to give this report.

For the professional grower and the semi-professional amateur the book provides a fund of information succinctly given. There are charts for operations discussed and these charts make reference to them simple and easy for the gardener in a hurry.

"Modern Gardening" discusses soils, plant diseases, insect control, weed control, fertilizers and ways to apply them, methods of propagation, hybridization, and some interesting data on virus diseases which are the hardest of all to combat. Dr. Pirone brings out the fact that, as of now, there are no remedies for virus diseases in plants; surgery, or destruction of the plant if surgery fails, is the only method to combat the spread of virus.

The answers to five hundred questions most usually asked of Dr. Pirone will be a boon to most gardeners. A chapter on Household Hints will also supply some interesting information.

The book *"Modern Gardening"* is well titled; it is just that. It would be unfair to expect such a book to "inspire" the amateur. It will sober him to contemplate a gardening future surrounded with so many dire possibilities to his efforts but let him console himself that many of these diseases will never be encountered in our Pacific Northwest. Our soils are still virgin so far as the amateur's efforts go. Lastly, old Mother Nature has been producing her miracles of growth and beauty for time out of mind. She is the plant pathologist supreme—chemist and alchemist since time was. She will cooperate with the buyer of a ten-cent packet of seed or some purchaser of a rare hybrid rhododendron with impartial aid. When the gardener's effort ceases, she completes the miracle.

Gardening is the only art where the master artist completes man's designs.

MRS. E. B. HANLEY

✓ ✓ ✓

"Hollies," by H. H. Hume. The Macmillan Company, New York (August, 1953). Price \$6.75.

THE appearance of Dr. Hume's anticipated book on hollies will be welcomed by many horticulturists and nurserymen as well as the members of the Holly Society of America.

Besides being the first book on its subject it is notable for the wide coverage, which includes

something of the folklore, the botany, propagation, pollination, culture—ornamental as well as commercial—usage in gardens, and a chapter on those in which the leaves contain caffeine and have been utilized for making a tonic drink; in addition, very adequate descriptions of most species known to be in cultivation and of the many horticultural varieties of *Ilex Aquifolium*, *I. opaca*, *I. crenata*, and a few other species.

Another feature of the book which will be particularly appreciated, as it was in the author's "Azaleas" (1947), to which the present work is similar in format and arrangement although larger, is the number of excellent photographs showing approximately 16 species and about 55 horticultural varieties, usually as cut twigs either in flower or fruit, many of the original trees of the now numerous forms of the American holly, and a series illustrating the commercial growing, cutting and packing of English holly in Oregon.

Why, incidentally, *Ilex Aquifolium* should be called by this common name is uncertain, since it grows just as freely in France, Germany and other parts of Europe as in England. Well over a century ago J. C. Loudon in his "Arboretum et Fruticetum" (1844) quoted the common name as "prickly-leaved or common holly," while modern English floras simply use the word "holly" with no adjective.

The book is divided into seventeen chapters covering 234 pages. Chapter 2, "Botany of Hollies," whilst mentioning the several hundred known species, describes, keys, and partially illustrates only those at present in cultivation—less than forty in all—of which about one half are native to the eastern or southeastern United States, the majority of the remainder to China and Japan. The number yet to be introduced to our arboreta, parks and gardens is thus potentially very large, although many of them, from their habitats in the tropics or sub-tropics, will only be appropriate for similar regions in this country.

There is a key to 33 species, of which 8 are deciduous, and excellent half size drawings, on one page, of the leaves of 29 species and several varieties, and on another, of the fruiting clusters of 12 species of which 7 are North American natives.

Ilex ciliospinosa is mentioned twice, but not distinguished from *I. centrochinensis* with which it has been confused.

Chapters 3, 4, 5, and 6 describe the varieties of American, English, Chinese (*Ilex cornuta*) and Japanese (*I. crenata*) hollies respectively. Of the first, 60 forms are included, but as the author rightly suggests, "It is very likely that some of the varieties of American holly now being propagated will be discontinued as more is learned of their behavior and value under different conditions." Perhaps the Holly Society will set up Trial Gardens to discover the best forms, since it is a matter of some horticultural importance.

In the second of these Dr. Hume notes that *Ilex Aquifolium* is much hardier than it is given credit for, examples being found as far north as Cape Cod and another form grows successfully in St. Louis. From the details published in the "Jour. Roy. Hort. Soc." in November, 1948, this holly is evidently hardy in most places to

about 0° F., and this has been borne out by experience in Seattle.

About 36 varieties are now propagated for sale in the United States, but to our knowledge not all are true to name; Dr. Hume's work will help to clear up this condition, since he describes 32 forms or hybrids.

It is regrettable that no distinction has been made between the true variations of *I. Aquifolium* and those which are forms of the hybrid *I. altaclarensis*, as noted, for example, by Rehder in his "Manual of Trees and Shrubs." The illustrations on pp. 92 and 93 very clearly show the differences between the two types, *Wilsonii* and *Hendersonii* being examples of the hybrid. About one quarter of those mentioned appear to fall into the latter group.

Of the Chinese holly, *I. cornuta*, 6 (one with yellow fruits), and of the very hardy Japanese species, *I. crenata*, 14 variations are mentioned, of which 6 originated in Japan, the rest in this country.

Chapter 7, "Miscellaneous Evergreen Hollies," includes all others not already covered, both native and foreign, while chapter 8 deals with 10 deciduous species, of which 6 are North American.

In chapter 9, "Caffeine Hollies," nearly 30 pages are given up to details of the discovery, history, and the materials used by the natives of the south and southeastern coastal regions of the United States, where *Ilex vomitoria* was the principal species concerned, and in South America on the borders of Brazil, Argentina and Paraguay where the tree *I. paraguariensis* was utilized. Several illustrations depict the decorated tubes and maté cups used in the process of drinking the infusion of leaves.

Data on "Noteworthy Hollies" is supplied in chapter 10, and supplemented by fifteen or so photographs showing original trees of various American hollies in situ, from which one can obtain a good idea of its mature size and variation in form; "Croonenburg," and the "B. & O. holly" seem to be especially desirable types in this latter character.

In chapter 11, "Holly Propagation," all usual methods are described—by seeds, cuttings, division (*I. glabra* and *I. coriacea*), and various forms of grafting. Dr. Hume notes that it is not always necessary to stratify holly seeds, although the species *Aquifolium*, *cornuta* and *opaca* do apparently require this treatment.

Questions of pollination are answered in chapter 12; it is suggested either that a male and female tree be planted together, or that one sex may be grafted or budded on the other where necessary. (Nevertheless occasional isolated female trees occur which do bear fruit regularly with no male plant nearby). Black-fruited and red-fruited will not interpollinate one another, nor seemingly will deciduous and evergreen species. *Berberis* behave in almost similar fashion.

The chapter on "Planting Hollies" contains much excellent information, obviously the product of long experience, and is well worth reading and digesting. That on "Holly Culture" covers mulching, pruning, watering, fertilizing, etc., while chapter 15 puts forward suggestions, both verbally and pictorially, as to various ways in which the different types of hollies may be used in gardens and parks.

(Continued on Page Twenty-nine)

ARBORETUM NOTEBOOK

This department is published for correspondence and pertinent comments by experienced growers on interesting plants and their culture. We solicit your questions but space limitation necessitates the publishing of only such answers as we deem of general interest.

... Garden Notes and Hints ...

SEPTEMBER

Blossoms or seed pods should be cut from phlox plants. Phlox does not "revert in color." When strange-colored blossoms occur in the phlox bed they are undoubtedly seedlings.

Penstemon, the common Beard-Tongue, is most valuable for summer-flowering herbaceous borders. It grows from one and one-half to three feet tall with colors ranging from white through pink to red. They are reliably hardy and withstand rainy weather. They have a long season of bloom, propagate easily by cuttings and come fairly true from seed. Among some of the best named varieties are "Southgate Gem," "Middleton Gem" and "Castle Forbes."

Evergreens may be planted now and many perennials that are through blooming may be divided and replanted. The leaves of newly planted shrubs and plants should be frequently sprayed and the soil over their roots kept moist.

This is the month to select spring-blooming bulbs. Consider the crocus species, tulips and daffodils. Winter-blooming crocus is an exciting experience for all gardeners.

A post card will bring you comparatively all the catalogues. They are the most fascinating reading a gardener can collect. A package of rare seeds is a perfect Christmas gift or for something more elegant a new rose bush or other shrub. It will be delivered on the date specified.

OCTOBER

If looking for a shrub to plant with dwarf rhododendrons try *Enkianthus*. The blooms, in spring, blend beautifully with all the colors of rhododendrons; the slender growths add a light shade and the brilliant fall colors of *Enkianthus* leaves give an added season of beauty to the area.

Winter aconites (*Eranthis hyemalis*) seem to prefer a fairly damp location—not wet but moist. They are often difficult to establish in our gardens. They hate to be out of the ground for any length of time. If necessary to transplant, replant them immediately. Their dear, yellow, buttercup-like blooms with the frill of green leaves is charming planted with snowdrops.

Now one can begin planting deciduous trees. The sap is still active to help the roots to establish themselves.

Our gardens in the Northwest have a great tendency to become overcrowded. Before buying new shrubs look over the garden and remove those that are keeping the light and air away from their neighbors in the dull days of winter.

NOVEMBER

Tender, summer-flowering bulbs (to name a few, begonias, dahlias, *Ismene*, tuberoses) should be lifted now and stored in a dry, cool, frost-proof location.

Most of the spring-flowering bulbs should be planted by now. Tulips may wait a bit, if neces-

sary. Bone meal dug in each hole gives the bulb food when it starts to grow.

Examine as many branches of trees and shrubs as possible to find and destroy caterpillar nests. Forecasts predict a large infestation next summer. Spray according to directions.

The *Pernettya* berries on the bushes at the Arboretum will be showing in November. No low-growing, evergreen shrub is more beautiful. They are valuable to plant with late-blooming heathers to make a satisfying picture.

✓ ✓ ✓

When dividing and replanting primroses one tablespoon of lindane should be mixed with the soil where each is to be planted. This will kill the strawberry weevils and also the wireworms which are more destructive than the weevils. The so-called strawberry weevil feeds on the roots of the plant but the wireworm (a tiny, yellowish worm, the size of a fine wire) attacks the plant from the top, working its way through the heart, and destroys the plant in one season. When the leaves of a plant look wilted and the top lifts easily from the roots, look for the diminutive worm that has demolished it.

E. M. B.

✓ ✓ ✓

Every Monday morning it is a custom in my garden to shear the viola plants. All the spent blooms and leggy growths are cut to the ground, only leaving the lower growths which are generally beginning to show new leaves and blossoms. By the following Saturday or Sunday, when guests arrive, the new blooms have opened and the border is full of color.

F. B.

✓ ✓ ✓

PLANT COMBINATIONS

Clara Butt tulips under *Prunus Pissardi*.

White broom, a background for *Rhododendron Vaseyi*.

Spiraea Normani and fall-flowering heathers.

Enkianthus over low-growing Michaelmas daisies.

Fall-blooming *Crocus speciosus* under *Camellia sasanqua* "White Dove."

We will be particularly delighted to publish your favorite "Plant Combinations." As is noted at the top of your ARBORETUM NOTEBOOK, "This department is published for correspondence and pertinent comments" . . . and we feel that it will be much more interesting if all our members would take part in its columns.

Please send your contributions for the Winter issue before November 1st and mail to the Arboretum Foundation, c/o University of Washington Arboretum, Seattle 5, Washington.

✓ ✓ ✓

To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.

—WILLIAM WORDSWORTH

THE ARBORETUM FOUNDATION UNITS

will hold their annual

FALL PLANT SALE

at the Arboretum

October 22nd

Starting at 10:00 a.m.

List of Plant Names

(Continued from Summer, 1953, issue)

Lactuca	old Latin name lac, referring to milky juice
lacunosus	with holes or pits
ladanifera	ladanum-bearing (resinous gum)
Laelia	personal name
Laeliocattleya	compounded from Laelia and Cattleya
laetiflorus	bright or pleasing flowered
laetevirens	light or vivid green
laetus	bright, vivid
laevigatus	smooth
laevipes	smooth-footed
laevis	smooth
laeviusculus	smoothish
Lagenaria	Latin lagena, a bottle
lagenarius	of a bottle or flask
Lagerstroemia	for Magnus Lagerstroem, friend of Linnaeus
Lagunaria	named for resemblance to Lagunaea
Lagurus	Gr. lagus, a hare, oura, a tail
Lallemantia	after J. E. Lallemant of Leningrad
Lamarckia	after J. B. Lamarck, French naturalist
Lamium	Gr. for throat, referring to shape of corolla
lampropeplum	bright covering
lanatus	woolly
lanceifolius	lance-leaved
lanceolatus	lanceolate
lanigera	wool-bearing
lanipes	woolly-footed or stalked
lanosus	woolly
Lantana	old name, once applied to Viburnums
lanuginosus	woolly, downy
Lapageria	from name of Empress Josephine (nee La Pagerie)
Lapeyrousia	for F. F. G. de Lapeyrouse, French navigator
lappaceus	bearing buds
lapponicus	of Lapland
Lappula	diminutive of lappa, a bur
Lardizabala	after Spanish naturalist, Lardizalay Uribe
laricifolius	larch-leaved
laricinus	larch-like
lasiacanthus	woolly, or pubescent-spined
lasiandrus	woolly-stamened
lasianthus	woolly-flowered
lasiocarpus	woolly-fruited
lasiodontus	woolly-toothed
lasiosylum	woolly style
lateriflorus	lateral-flowered

lateripes	lateral-stalked
lateritius	brick-red
Lathyrus	named by Throphrastus
latiflorus	broad-flowered
latifolius	broad-leaved
latifrons	broad-fronded
latilobus	broad-lobed
latimaculatus	broad-spotted
latipes	broad-footed or stalked
latispinus	broad-spined
latisquamus	broad-scaled
latissimus	broadest, very broad
Latoucheae	after Madam de la Touche
latus	broad, wide
laudatus	praiseworthy
Laurelia	from Laurus because of resemblance to leaves
laurifolius	laurel-leaved
laurinus	laurel-like
Laurus	ancient Latin name of the Bay tree
Lavandula	Lat. lavo, to wash, referring to use in bath
lavendulaceus	lavender-like
Lavatera	from the Lavater brothers of Zurich
laverateroides	lavatera-like
laxiflorus	loose-flowered
laxifolius	loose-leaved
laxus	lax, open, loose
Layia	after Thomas Lay, naturalist
Leclerei	after M. Leclere
ledifolius	ledum-leaved
ledoides	ledum-like
Ledum	ancient Greek name for Cistus
leianthus	smooth-flowered
leiocarpus	smooth-fruited
Leiophyllum	from leitos, smooth, and phyllon, smooth foliage
leiopodum	smooth-footed
Lemaireocereus	Lemaire's Cereus, a genus of Cactaceae
Lemna	old Greek name for Duckweed
Lens	ancient name of lentil
Leonotis	Gr., lion's ear
Leontopodium	Gr., lion's foot
Leonurus	Gr., lion's tail
lenticularis	lens shaped
lentiginosus	freckled
lentiscifolius	lentiscus-leaved
lentus	pliant
leopardinus	leopard-spotted
Lepachys	Gr., a thick scale
Lepidium	Gr., a little scale, for shape of pods
lepidophyllus	scaly-leaved
lepidostylum	scaly-styled
lepidotus	with small, scurfy scales
lepidus	graceful, elegant
Leptodermis	Gr., leptos, thin, and derma, skin
leprosus	scurfy
leptanthus	thin-flowered
leptocaulis	thin-stemmed
leptocladus	thin-stemmed
leptolepis	thin-scaled
leptopetalus	thin-petaled
leptophyllus	thin-leaved
leptosepalus	thin-sepaled
leptopus	slender stalked
Leptospermum	Gr., slender seed
leptostachyus	thin-spiked
leptothrium	with thin leaves
Leptosyne	Gr. slenderness

(To be continued)

New or Unusual Plants in the Arboretum

(Continued from Page Fifteen)

leaves at least biennially if not annually to supply humus.

The light brown bark is thin and papery, peeling off in strips during the summer months like some of the birches. Leaves on vigorous shoots of this variety may be 10-11 inches long and 5-6 inches wide, ovate and somewhat convex in form, rough to the touch from the coarse, bristly white hairs thickly covering the underside, prominently and deeply veined. The large, branching flower heads, carried on shoots some 18-24 inches long, are approximately 6 inches in width and composed of myriads of very small lavender-colored blooms, surrounded by about a dozen conspicuous, white to pale lilac sterile florets. There is a definite but not sweet scent which no doubt attracts bees.

This fine deciduous shrub is native in central and western China, whence it was introduced by Ernest H. Wilson in 1907, although he was not its first discoverer. There it grows in dense woods and thickets at a comparatively low altitude on limestone, sandstone or shale, seldom as high as 5,000 ft. and even down to 2,000 ft. in the sub-tropical zone, and has consequently been considered of doubtful hardiness both in this country and in Great Britain in regions where winter temperatures frequently go below 10° F. However, we have had no trouble here on that score, and it is evidently hardier than the related Japanese *H. involucrata*.

Carl Linnaeus—1707-1778

(Continued from Page Five)

practically as he had them but with the phraseology modernized.

At the time Linnaeus was working on these two important manuscripts, he was acting as personal physician to a Mr. Clifford, who was not only one of Sweden's wealthiest men but had one of the finest botanic gardens in the world. In addition to plants that would grow in that climate he had greenhouses, the first heated ones Linnaeus had ever seen, where tender plants and trees were grown. Mr. Clifford wanted the new and rare plants being sent back by the early explorers for his collection. This mission took Linnaeus to England where at the Chelsea Botanic Garden he met Philip Miller, who supplied him with many rare plants, some of which were not yet classified. Mr. Miller was so pleased with Linnaeus' method of classification that he introduced it in the garden—the first to use it in Great Britain.

Upon returning from England, Mr. Clifford asked to have his collection cataloged, described and illustrated. It was now that Linnaeus realized that until his "Fundamenta" and "Critica Botanica" were published the volume on Mr. Clifford's collection could not be understood. In 1735 he finished this work and the following year published "Hortus Cliffortianus." During a period of less than four years Linnaeus had written three documents that shook the botanic world, had made at least nine classifications and cataloging of collections some of which had been very large,

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and had written a volume for Mr. Clifford. Exhausted and ill, he decided to go home to Sweden but by way of France. By 1739 he was back in Sweden, had been formally betrothed to his Sara and had picked Stockholm as his field for the practice of medicine and his future home.

After some struggle in getting established he became physician to the Queen and security and happiness seemed to have been won. However, he was not satisfied, for botany and not medicine was his vital interest. On the death of Dr. Rudbeck in Upsala, the chair was offered Linnaeus and he gladly accepted. Here he spent the remainder of his life teaching and writing. His binomial nomenclature was not fully accepted until during the 1750's upon the publication of "Species Plantarum."

Upon his death in 1778 his numerous manuscripts and library were purchased by James Edward Smith in London. Later, with the help of Sir Joseph Banks, president of the Royal Society, and of Bishop Goodenough, a Linnaean Society was formed with Smith as its president. This post he kept until his death in 1828, when the Linnaeus library was bought by the Society and has been kept by them since.

Linnaeus did a great work for botany but his name seldom appears in connection with plants and the general public seems to know little of his contributions. At the time that his library was brought to England, Mr. William Cox wrote: "The great merits of Linnaeus as a naturalist are to be estimated from the rude state in which he found all branches of natural history and the perfection to which he carried them; in drawing order from confusion and perspicuity from darkness; his understanding, comprehensive yet accurate, was capable of combining and arranging an almost infinite variety of objects which the magnitude of the greatest could not fatigue, nor the insignificance of the smallest elude."

1 1 1

Book Reviews

(Continued from Page Twenty-five)

Finally there are chapters on "Holly Orchard-ing" and "Holly Pests," both illustrated, so that commercial growers are also catered for. The

index appears very complete, but the lack of a comprehensive bibliography is very noticeable when so many references to earlier works are scattered throughout the book.

Of the nine color plates those of the varieties "Old Heavyberry" (also on the dust cover) and "Slim Jane" are superior to the remainder, which might well have been reduced in number and consequently lowered the somewhat high cost of publication with no loss to the value of the book as a whole.

Despite these few apparent criticisms it can be truly said that Dr. Hume, now retired from the positions of Provost and Dean of Agriculture at the University of Florida, has well earned the gratitude of nurserymen, horticulturists, plain gardeners and plant lovers not only for this work, which will certainly be our chief source of reference on the genus *Ilex* for many years to come, but also for his several earlier achievements on azaleas, camellias, and other subjects—all of them of great value and of frequent use in the Arboretum library.

B. O. M.

1 1 1

"*Conifers in Britain*." B. Alwyn Jay. Published by Adam and Chas. Black, London, 1952; illustrated. Price 35 shillings (\$5.00).

ALL good books concerned with the identification of trees are characterized by technically correct descriptions and usable keys. Many are well illustrated. But no book of this type—at least to my knowledge—includes such a large number of detailed photographic studies of botanical features as does this one. There are 136 plates, and in these illustrations lies the main value of this book. They feature the twigs, foliage, buds, and similar characteristics as one would view them by means of an eight- or ten-power hand lens. These photos are so well done that the reader will not find the lack of photos of the tree itself, in each case, an important omission.

However, the above emphasis on the quality of the illustrations need not be taken as an implication that the descriptive text is not valuable. This book contains the usual brief keys which outline the distinguishing differences between various genera and species treated in these pages. Detailed descriptions of species are included with the illustrations.

Since this book deals with the common forest and ornamental conifers in Great Britain, one can assume that it would be valuable in England. However, many of the species described have been introduced from other parts of the world; consequently those of us in the Pacific Northwest will find this book of interest since it includes many arboreal residents of this region. And since we are fortunate in the fact that our parks and gardens also contain trees from distant places this book has even wider interest to those of us who gain pleasure from learning the identity of the trees that we find growing about us.

Another interesting feature of this book is a list of species with general notes. Arranged in tabular form, this section of the book includes, for each species, its scientific name, common name, synonyms, country of origin, and remarks concerning miscellaneous features of interest.

—C. FRANK BROCKMAN.

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Oxford Botanic Garden

(Continued from Page Seventeen)

agation. Though not large, a representative collection of tropical and temperate plants is maintained. The most interesting house to most visitors is the aquatic house.

This was originally built for the *Victoria regia* water lily but now contains 24 tropical Nymphaeas, sugar, *Nelumbo*, *Cyperus*, Bromeliads and climbers; a moderately large collection of succulents is also grown, and the palm house contains amongst other things a considerable range of South African monocotyledons, particularly *Haemanthus* spp.

The history of the garden has been written by no fewer than three eminent Oxford men, but unfortunately the two earlier booklets are no longer in print or readily obtainable.

The first head gardener was Jacob Bobart. It is not known when he took over, but a deed dated 1641 confirms his appointment at a salary of £40 per year. We learn from a contemporary named Baskerville that he was in his youth a "soldier by which Imploy and travail he had opportunities of Augmenting his knowledge for to his native Dutch he added the English language and did understand latine pretty well. As to fabric of body he was by nature very well built (his son in

respect of him but a shrimp) tall strait and strong with square shoulders and a head well set upon them. In his latter dayes he delighted to weare a long beard and once against Whitsontide had a fancy to tagg it with silver, which drew much Company in the physic garden."

A catalogue of the plants growing was published in 1645 listing no fewer than 1,600 plants. John Evelyn visited the garden in 1654 when Bobart showed him the "sensitive plant, canes, olives, and rhubarb." The first Professor of Botany was Robert Morison, who was appointed in 1669. He had been involved in the Civil War and had fled to France, where he had charge of the French Royal Garden at Blois. When Charles returned to the throne, Morison came to London and was made King's Physician and Professor of Botany and later Professor of Botany at Oxford. He was killed in London by the pole of a coach, near Charing Cross, and buried in the Church of St. Martin's in the Fields in 1683. Bobart had meanwhile been succeeded as Head Gardener by his son, also Jacob. After Morison's death he was made acting Professor and besides looking after the garden carried on the botanical work which Morison had begun. He also collaborated with Ray, another noted botanist of his day. He died in December, 1719.

In 1728 a wealthy traveler and antiquarian, William Sherard, left part of his fortune to found the Chair of Botany which is still known as the Sherardian Chair. During his lifetime he had also given to the garden many of his books and his extensive herbarium. One of the conditions of the bequest was that his

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friend Dillenius should become Professor, and this he did in 1734. One of the greatest botanists of his time, he was an authority on the British Flora. His best known work is his "Hortus Elthamensis," but his principal work, the "Pinax," was never published. Linnaeus stayed with him in Oxford and they continued to correspond until his death in 1747. Linnaeus wrote of him, "There is nobody in England who understands or thinks about Genera except Dillenius and his loss to science is unspeakable." John Sibthorp succeeded his father as Professor of Botany though he had studied medicine and had taken his M.D. at Edinburgh. His writings and his companion Bauer's drawings are amongst the treasures of the Botany Department Library. He died a young man of 38 at Bath, and in the Abbey there is a memorial plaque which reads, "no name has a fairer claim to botanical immortality amongst the Martyrs of Science than that of Sibthorp."

There is a curious similarity between the histories of the Physic Gardens of Oxford and Chelsea. Both went through difficult times and almost touched zero, then by chance or by the interest of some influential person they were saved and given a new lease of life. Both have played a large part in the teaching of botany in the past and both are happily in flourishing condition today. It is to be hoped that this state of affairs will long continue. In 1951 the botany department and library were moved to new buildings a mile or so away, but this has not appreciably affected the old garden. Professor T. G. B. Osborn is retiring this year, his successor being Profes-

sor C. D. Darlington, Director of the John Innes Horticultural Institution.

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✓ ✓ ✓

Flowers have an expression of countenance as much as men or animals. Some seem to smile; some have a sad expression; some are pensive and diffident; others are plain, honest and upright; like the broad-faced sunflower and the hollyhock.—HENRY WARD BEECHER.

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Foster's Island Bird Sanctuary

(Continued from Page Fourteen)

WESTERN RED DOGWOOD (*Cornus pubescens*). Bunches of small white berries are seldom allowed to ripen before eaten by sparrows, towhees, robins, thrushes, etc.

WILD BLACKCAP (*Rubus leucodermis*). Fruit attractive to most berry-eating birds, especially thrushes.

Besides these natural foods for attracting birds the desire to study bird life more closely is provided in placing feeding stations in several protected areas. The purpose in doing this is to bring the birds into closer range for study and observation; to give them a friendly welcome which they seem to instinctively recognize, and to provide necessary food if the ground is frozen in winter. Food should be in the stations throughout the year. The protein in winter is supplied with fat to take the place of insects and bugs not so readily available if cold is severe.

Winter and Spring Blooming Heaths

(Continued from Page Twenty-one)

ditions, how they associate with other plants, and their position in relation to light. Remember that a well-placed, well-planted shrub will always repay you many times.

1 1 1

And this our life, exempt from public haunt,
Finds tongues in trees, books in the running
brooks,

Sermons in stones and good in every thing.

—WILLIAM SHAKESPEARE

Benches might be placed in several strategic places where students or those wishing to study the birds may wish to wait and watch. People should walk quietly through the area and all dogs should be prohibited. Dogs with their playful romping, searching through underbrush, barking and chasing land and waterfowl near the island discourage bird life. A gate at the entrance might close automatically, thus keeping dogs from entering the grounds. A sign at the entrance naming the sanctuary would inform the general public of the purpose in protecting this area. Bird baths at some future time would attract many, although water is available on all sides in the lake.

Interest has already grown in this new section. The Washington State Federation of Garden Clubs has ordered two feeding stations and the Snoqualmie District has ordered one for the sanctuary.

I might close this article with an appropriate motto of the National Audubon Society.

“Our fields and mountains,
Our streams and ponds,
Our forests and grasslands,
The fish that weave the beauty into our
waters,
The birds that play with clouds,
And the furred animals that inhabit our
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